Method for Precision Measurement of Phase Difference

output indicator; a round sweep is formed on the screen and readings are taken by marking time. In one case, a sweep frequency is ω and the phase shift between time pulses is $n(\varphi_1 - \varphi_2)$; in another case, the sweep frequency is $n\omega$ and the pulse phase shift is $(\varphi_1 - \varphi_2)$. On the grounds of analysis of errors associated with the above schemes, the inference is drawn that the scheme with a switch but without the auxiliary multiplication channel is the most acceptable. A block diagram of a wide-band phasemeter with a frequency converter is presented.

V.G. Zh.

BOGACHEV, I. F.

Founding

Trimming of casting on stands. Lit. proizv. No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953. Unclassified.

1. BOGACHEV, I. F.

2. USSR (600)

4. Steel Castings

7. Allowances and tolerances in steel and iron castings, Lit. proizv., No. 5, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April, 1953, Uncl.

BOGACHEV, I.F., inzhener.

Draught standards for making forgings from rolled stock. Standartizatsiia no.1:50-51 Ja-Fe '56. (MLRA 9:2)

1.Zavod "Krasnoye Sormovo".
(Steel forgings--Standards)

BOGACHEV, I.F., inzhener.

Selection and tests of forging specimens. Standartizatsiia. no.5:61-63 S-O '56. (MLRA 10:1)
(Forging--Testing)

BOGACHEV, I.F., inzhener.

Checking sizes of hot-forged pieces. Vest.mash. 37 no.10:50 O '57.
(MIRA 10:11)
(Forging) (Gauges)

BOGACHEV, I.F.

Imperfections of state standards no. 7062-54 and 7829-55. Kuz.-shtam.proizv. 4 no.10:17-23 O '62. (MIRA 15:12)
(Forging--Standards)

DEMCHUK, Ivan Semenovich; BOGACHEV, I.F., inzh., retsenzent; DONSKOY, A.V., nauchnyy red.; YEROMITSKAYA, Ye.Ye., red.; CHISTYAKOVA, R.K., tekhn. red.

[Induction heating of metals in shipbuilding] Induktsionnyi nagrev metallov v sudostroenii. Leningrad, Sudpromgiz, 1963. 129 p. (MIRA 16:6)
(Shipfitting) (Induction heating)

BOGACHEV, I.F.

Increasing the durability of forging dies. Kuz.-shtam. proizv. 5 no.10:48-3 of cover O '63. (MIRA 16:11)

BOGACHEV, I.I.

BELYNSKIY, S.V.; BOGACHEV, I.I., professor, doktor tekhnicheskikh nauk, retsenzent; BUTAKOV, D.K., dotsent, kandidat tekhnicheskikh nauk, redaktor; SYRCHINA, M.M., inzhener, vedushchiy redaktor, redaktor literatury po goryachey obrabotke metallov.

[Investigation of cast and forged steel] Issledovanie litoi i kovanoi stali. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1952. 210 p. [Microfilm] (MLRA 7:10)

1. Uralo-Sibirskoye otdeleniye Mashgiza (for Syrchina).
(Steel)

BOGACHEV, I. I.

Metallografiia chuguna (Metallography of pig iron). Sverdlovsk, Mashgiz, 1952. 368 p.

SO: Monthly List of Russian Accessions, Vol 6, No. 3, June 1953

Bogachev I. I.

MINTS, Rafail Isaakovich; BOGACHEV, I.I., professor, doktor tekhnicheskikh nauk; DUGINA, N.A., tekhnicheskiy redaktor.

[Innovations in heat treatment, combination of bright hardening with oxide coating] Novoe v termicheskoi obrabotkke; sovmeshchenie svetloi zakalki s oksidirovaniem Pod.red.I.I.Bogacheva, Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1956. 38 p. (MLRA 10:4)

(Metals--Heat treatment)

BOGACHEV, I. I.

PHASE I BOOK EXPLOITATION 101

Mints, Rafail Issakovich

Novoye v termicheskoy obrabotke; sovmeshcheniye svetloy zakalki s oksidirovaniyem (A New Method of Heat Treatment; Combination of Bright Quenching and Oxidation) Moscow-Sverdlovsk, Mashgiz, 1956. 39 p. 4,000 copies printed.

Ed.: Bogachev, I. I., Professor, Doctor of Technical Sciences; Chief Ed. of the Ural-Siberian MAShGIZ section: Kaletina, A.V., Engineer; Tech. Ed.: Dugina, N. A.

PURPOSE: The book is intended for engineering and technical personnel of machine-building plants.

COVERAGE: The brochure describes a new and effective method of treating steel parts. This method makes it possible to combine heat treatment with oxidation. The essence of this method lies in quenching parts in hot solutions. In this connection the brochure describes various methods of quenching in hot solutions and the properties the parts acquire by these methods. Quenching practices are

Card 1/2

A New Method of Heat Treatment; (Cont.) 101

employed by the following Soviet plants: "Frezer" plant, Chelyabinsk tractor plant, Kolomna plant imeni V.V. Kuybyshev, plant imeni Voroshilov, and "Krasnaya Etna" plant. There are 13 Soviet references.

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AVAILABLE: Library of Congress (TS 320 .M64)

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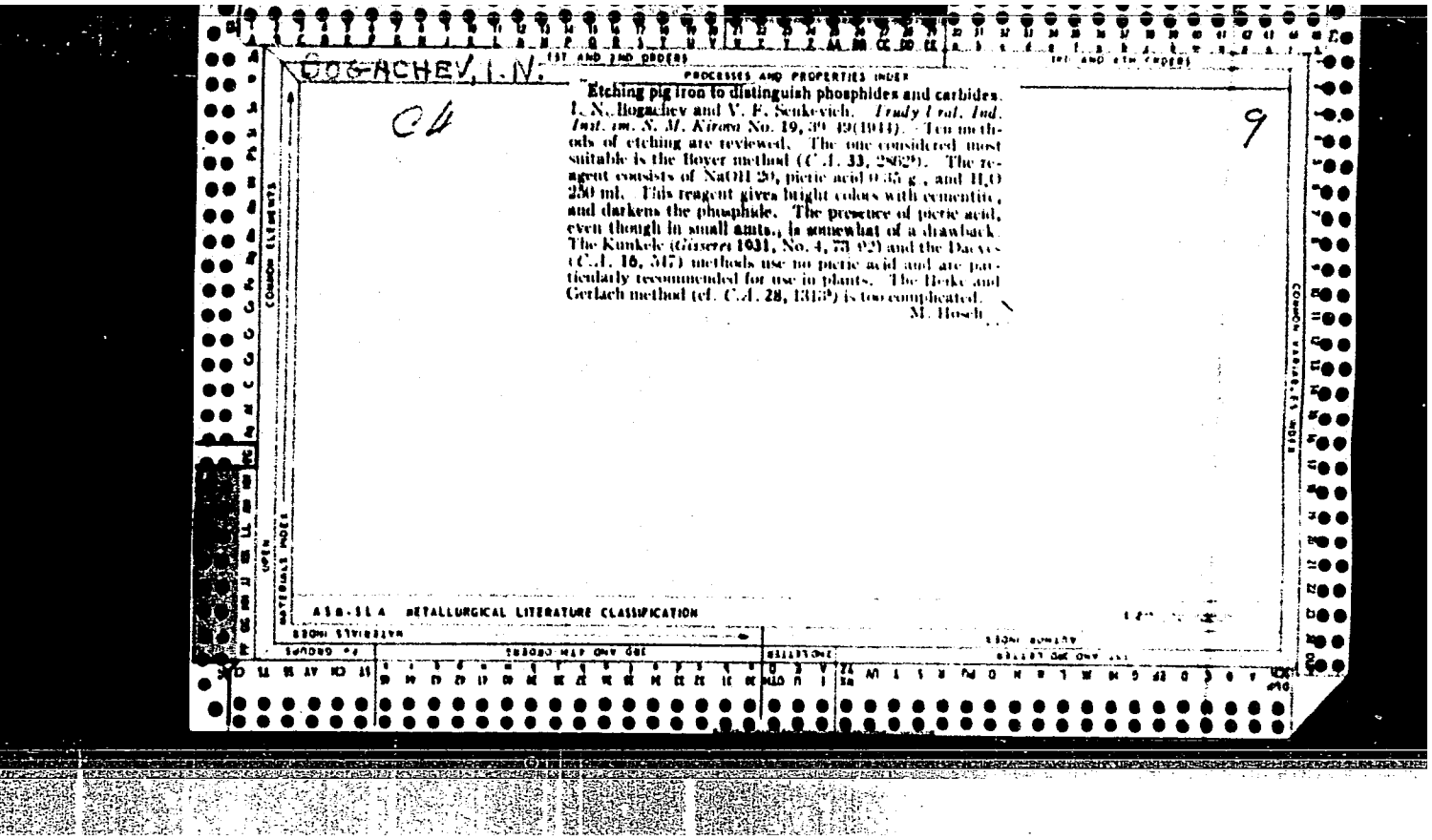


BOGACHEV, I. N.

C4

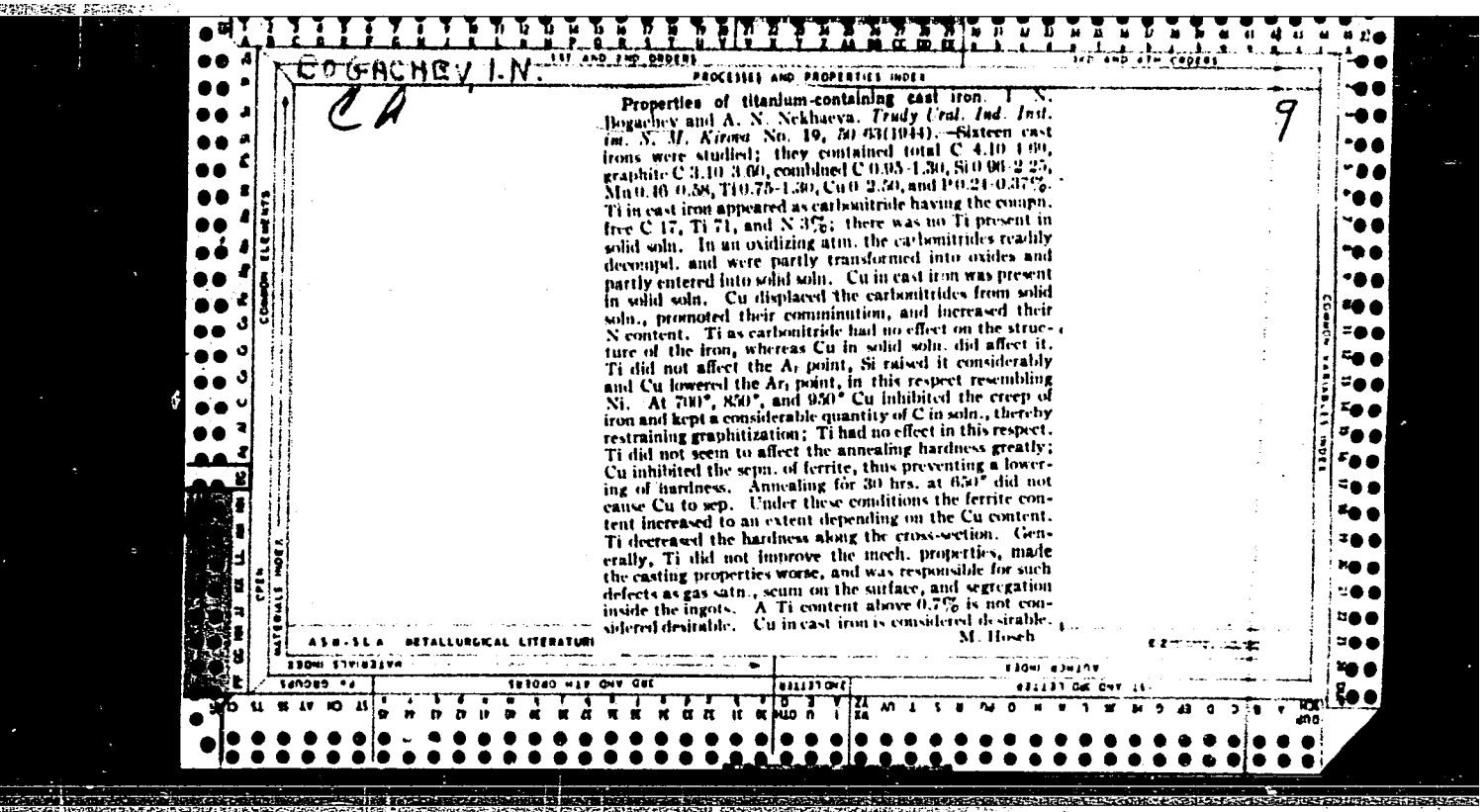
PROCESSES AND PROPERTIES INDEX

9

Etching pig iron to distinguish phosphides and carbides. I. N. Bogachev and V. F. Senkevich. *Trudy Ural. Ind. Inst. im. S. M. Kirova* No. 19, 39–49(1944). Ten methods of etching are reviewed. The one considered most suitable is the Boyer method (*C.A.* **33**, 2862). The reagent consists of NaOH 20, picric acid 0.35 g., and H_2O 250 ml. This reagent gives bright colors with cementite, and darkens the phosphide. The presence of picric acid, even though in small amts., is somewhat of a drawback. The Kunkele (*Giesserei* **1931**, No. 4, 73–9) and the Dacyes (*C.A.* **16**, 347) methods use no picric acid and are particularly recommended for use in plants. The Berke and Gerlach method (ref. *C.A.* **28**, 1315[5]) is too complicated.

M. Hosch

A58-11A METALLURGICAL LITERATURE CLASSIFICATION

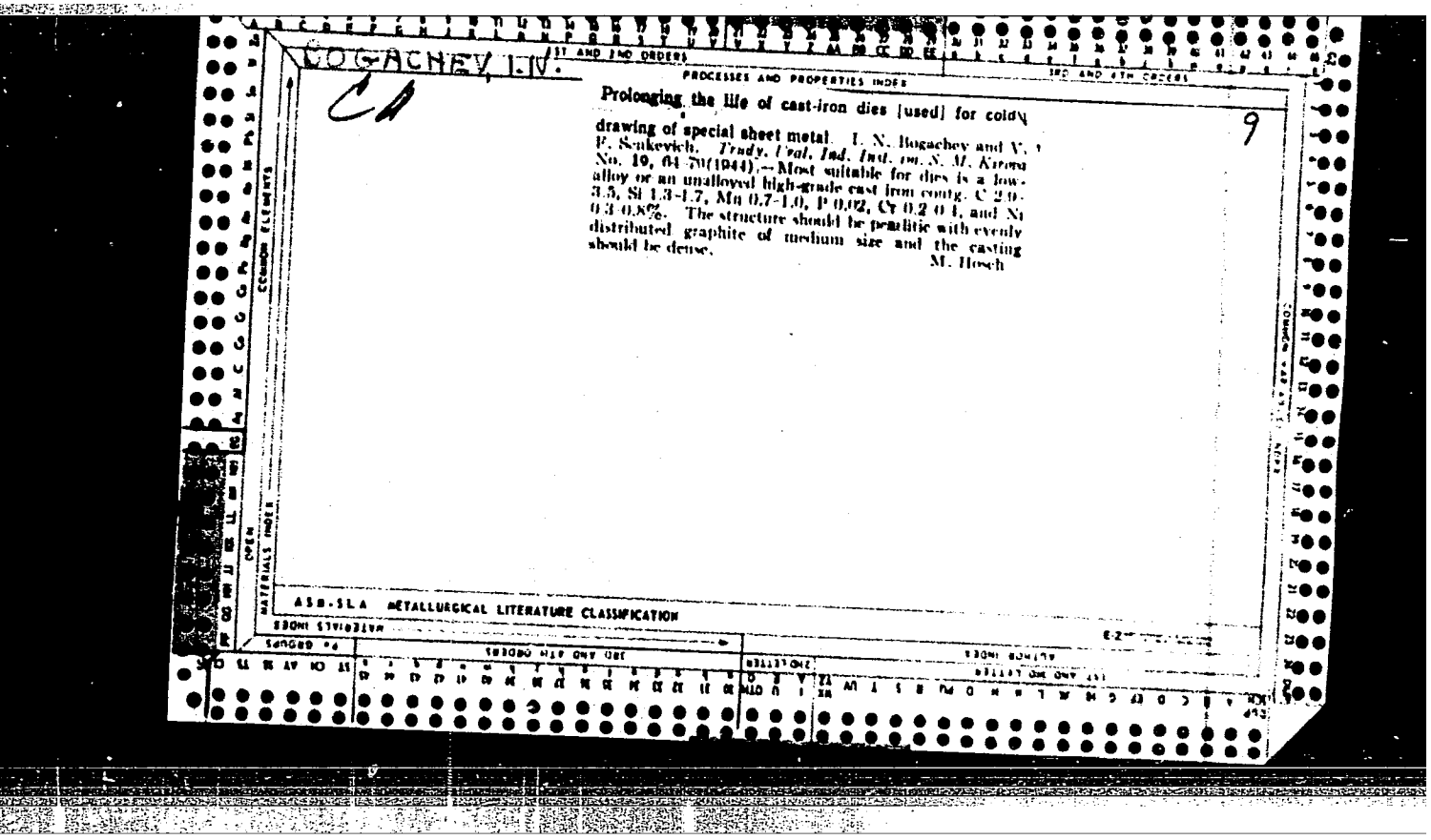

COGACHEV, I.N.

CA

9

Properties of titanium-containing cast iron. I. N. Bogachev and A. N. Nekhaeva. *Trudy Ural. Ind. Inst. im. S. M. Kirova* No. 19, 50-63(1944).—Sixteen cast irons were studied; they contained total C 4.10-4.90, graphite C 3.10-3.60, combined C 0.95-1.30, Si 0.98-2.25, Mn 0.46-0.58, Ti 0.75-1.30, Cu 0-2.50, and P 0.24-0.37%. Ti in cast iron appeared as carbonitride having the compn. free C 17, Ti 71, and N 3%; there was no Ti present in solid soln. In an oxidizing atm. the carbonitrides readily decompd. and were partly transformed into oxides and partly entered into solid soln. Cu in cast iron was present in solid soln. Cu displaced the carbonitrides from solid soln., promoted their comminution, and increased their N content. Ti as carbonitride had no effect on the structure of the iron, whereas Cu in solid soln. did affect it. Ti did not affect the A_1 point, Si raised it considerably and Cu lowered the A_1 point, in this respect resembling Ni. At 700°, 850°, and 950° Cu inhibited the creep of iron and kept a considerable quantity of C in soln., thereby restraining graphitization; Ti had no effect in this respect. Ti did not seem to affect the annealing hardness greatly; Cu inhibited the sepn. of ferrite, thus preventing a lowering of hardness. Annealing for 30 hrs. at 650° did not cause Cu to sep. Under these conditions the ferrite content increased to an extent depending on the Cu content. Ti decreased the hardness along the cross-section. Generally, Ti did not improve the mech. properties, made the casting properties worse, and was responsible for such defects as gas satn., scum on the surface, and segregation inside the ingots. A Ti content above 0.7% is not considered desirable. Cu in cast iron is considered desirable.

M. Hosch



BOGACHEV, I. N.

Fundamental modifications of cast-iron Sverdlovsk, Gos. nauch.-tekhn. izd-vo mashinostroit. lit-ry, 1948. 37 p. (50-21370)

TN710.B57

BOGACHEV, I. N. and V. F. SENKEVICH

Struktura i svoistva porshnevykh kolets. Moskva, Mashgiz, 1949. 127 p. 4 plates, diagrs.

Bibliography: p. 127.

Structure and properties of piston rings.

DLC: TJ533.B6

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

BOGACHEV, I-N.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 437 - I

BOOK Call No.: TN756.B58

Authors: BOGACHEV, I. N. and POPOV, A. A., editors
Full Title: PHASE TRANSFORMATION IN IRON-CARBON ALLOYS
Transliterated Title: Fazovyye prevrashcheniya v zhelezouglerodistykh splavakh

Publishing Data
Originating Agency: None
Publishing House: State Scientific and Technical Publishing House of Literature on Mechanical Engineering
Date: 1950 No. pp.: 174 No. of copies: 4,000
Editorial Staff: None

Text Data
Coverage: This is a symposium on phase transformations in iron-carbon alloys consisting of eight lectures delivered by six professors in metallurgy in seminars on the theory and practice of heat treatment of steel at the S. M. Kirov Ural Polytechnic Institute:
1. I. N. Bogachev's lecture deals with physics of the liquid phase, formation and growth of nuclei, kinetics of crystallization of pure metals (tin, lead, zinc), and particularities of crystallization of steel and cast iron. Curves, diagrams.
2. A. A. Popov discusses in great detail the diffusional shifting of phase limits in equilibrium diagrams depending upon the decrease in

the radius of curvature of the phase surface, direction of shifting, rate of diffusional shifting, diffusional formation of one phase at the expense of another, and formation of diffusional layers. Curves, diagrams.

3. In this lecture A. A. Popov makes an attempt to establish theoretical principles of formation of austenite, rather than outline the extensive experimental data. Therefore, he gives special attention to a) the concept of kinetics of diffusional shifting of phase limits, and b) grounds for a possible coexistence of two different mechanisms of transformation, which he calls "diffusional" and "non-diffusional". Plates, curves, diagrams.

4. V. D. Sadovskiy describes in detail the process of transformation of austensite to martensite, basing his conclusions on investigations of Soviet scientists, especially on the experimental research conducted by G. V. Kurdyumov for many years and awarded a Stalin prize in 1949. Plates, curves, diagrams.

5. L. E. Shevyakina's lecture concerns mathematical methods of solving the problem of transformation of austenite on continuous cooling on the basis of the isothermal transformation diagram. Curves, tables, diagrams.

6. V. F. Senkevich investigates the eutectoid transformation of cast iron with pearlite base. He notes some particularities in the behavior

Fazovyye prevrashcheniya v zhelézouglerodistykh splavakh AID 437 - I

of austenite in cast iron, describes the kinetics of isothermal transformations of austenite, transformation of austenite on continuous cooling, and formation of free ferrite. Plates, diagrams.

7. A. A. Popov discussed the decomposition of austenite in eutectic carbon steel and alloyed steels during continuous cooling at various rates, as well as the effect of carbon content and various alloying constituents (metals) on the highest and lowest critical cooling rates. Curves, tables.

8. V. C. Permyakov gives a theoretical analysis and experimental data of the structure and transformations of tempered carbon steel, G. V. Kurdyumov's scheme of the tempering process, mechanism of decomposition of martensite during tempering of carbon steel, and particularities of decomposition of martensite during tempering of alloyed steels. Curves.

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Fazovyye prevrashcheniya v zhelezouglerodistykh splavakh AID 437 - I

Purpose: This volume of collected lectures is meant for engineers, technicians and scientific personnel working in the field of metallurgy and heat treatment.
Facilities: None
No. of Russian and Slavic References: 44 at the end of chapters
Available: Library of Congress.

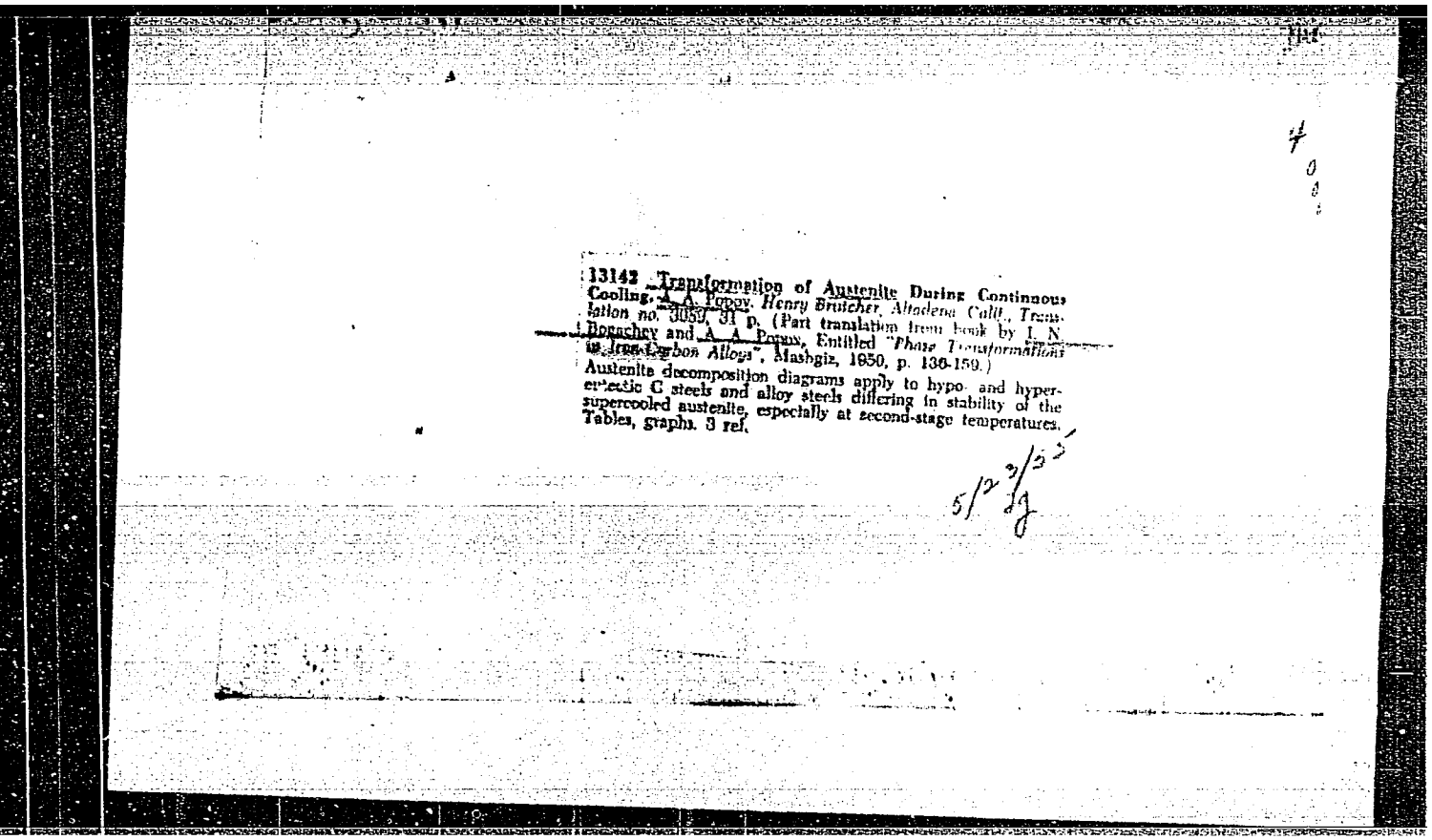
4/4

BOGACHEV, I. N., ed.

The heat treatment of metals; materials of the Conference of the Ural Department of the All-Union Scientific and Technological Society of Machine Construction Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry 1950. 413 p. (52-23331 rev)

TN672.V8

1. Metals - Heat treatment. I. Bogachev, I. N., ed.

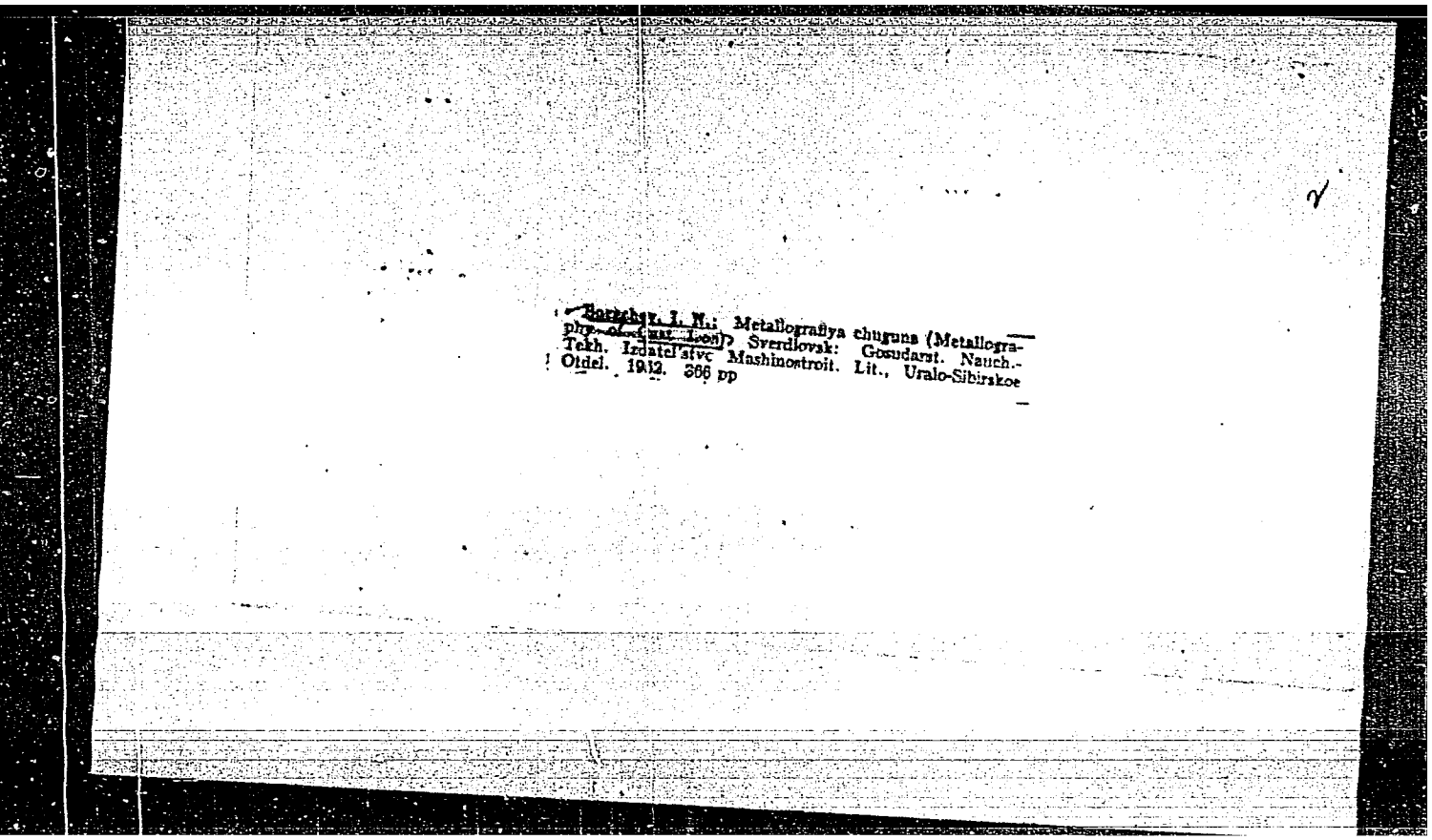


13142 Transformation of Austenite During Continuous Cooling, A. A. Popov. *Henry Brutcher, Altadena Calif., Translation no. 3059*, 31 p. (Part translation from book by L. N. Bogachev and A. A. Popov, Entitled "*Phase Transformations in Iron-Carbon Alloys*", Mashgiz, 1950, p. 136-159.)

Austenite decomposition diagrams apply to hypo- and hypereutectic C steels and alloy steels differing in stability of the supercooled austenite, especially at second-stage temperatures. Tables, graphs. 3 ref.

BOGACHEV, I.N.

[P.P.Anosov and the secret of Damascus steel] P.P.Anosov i sekret bulata. Sverdlovsk, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry [Uralo-Sibirskoe otd-nie Mashgiza] 1952. 138 p. (MLRA 6:10)
(Anosov, Pavel Petrovich, 1797?-1851) (Steel--History)



Bornatskiy, I. N.: Metallografiya chuguna (Metallography of [illegible] Iron) Sverdlovsk: Gosudarst. Nauch.-Tekh. Izdatel'stvo Mashinostroit. Lit., Ural-Sibirskoe Otdel. 1942. 366 pp

BOGACHEV, I.N.

LIVOVSKIY, P.G.; PAL'MOV, Ye.V., professor doktor, retsenzent; KRASNOV, K.V., inzhener, retsenzent; ZAKROCHINSKIY, S.V., inzhener, retsenzent; SHKLOVSKIY, M.B., inzhener, retsenzent; BOGACHEV, I.N., professor doktor tekhnicheskikh nauk, redaktor; AKHUN, A.I., kandidat tekhnicheskikh nauk, redaktor; BARANOV, V.M., kandidat tekhnicheskikh nauk, redaktor; RYZHIKOV, A.A., kandidat tekhnicheskikh nauk, redaktor; FILIPPOV, A.S., kandidat tekhnicheskikh nauk, redaktor; CHERNOBROVKIN, V.P., kandidat tekhnicheskikh nauk, redaktor; YAKUTOVICH, M.V., kandidat tekhnicheskikh nauk, redaktor; GRISHCHENKO, M.F., inzhener, redaktor; ZASLAVSKIY, I.A., inzhener, redaktor; KROKHALEV, V.Z., inzhener, redaktor; SOSKIN, M.D., inzhener, redaktor.

[Manual for the mechanic in a metallurgical plant] Spravochnoe rukovodstvo mekhanika metallurgicheskogo zavoda. Izd.3., ispr.i dop. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1953. 1112 p. (MLRA 7:4)
(Mechanical engineering--Handbooks, manuals, etc.)

BOGACHEV, I.N.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-30, 20 Feb - 3 Apr 1954)

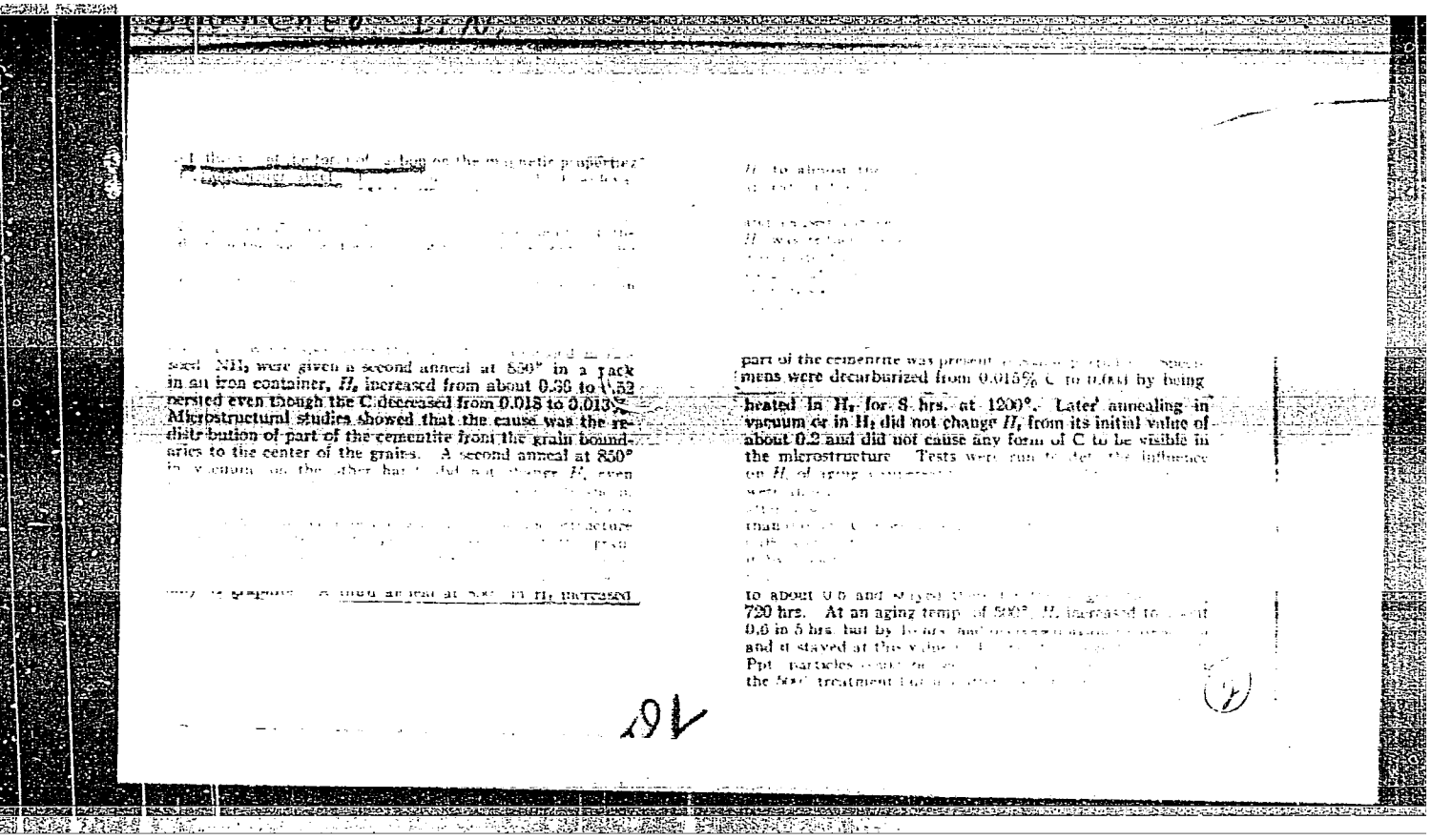
Name	Title of Work	Nominated by
Bogachev, I.N. Pyatnitskiy, A.N.	"P.P. Anosov and the Secret of Damascus Steel" (popular-scientific book)	Ural Polytechnic Institute imeni S.M. Kirov

SO: W-30604, 7 July 1954

Formation of oxide (anti-corrosion) films on treatment of steel in molten salts and alkalis. I. N. Bogachev and ... Minta. Novye Metody Termichesk. Obrabotki ...

... for example ...

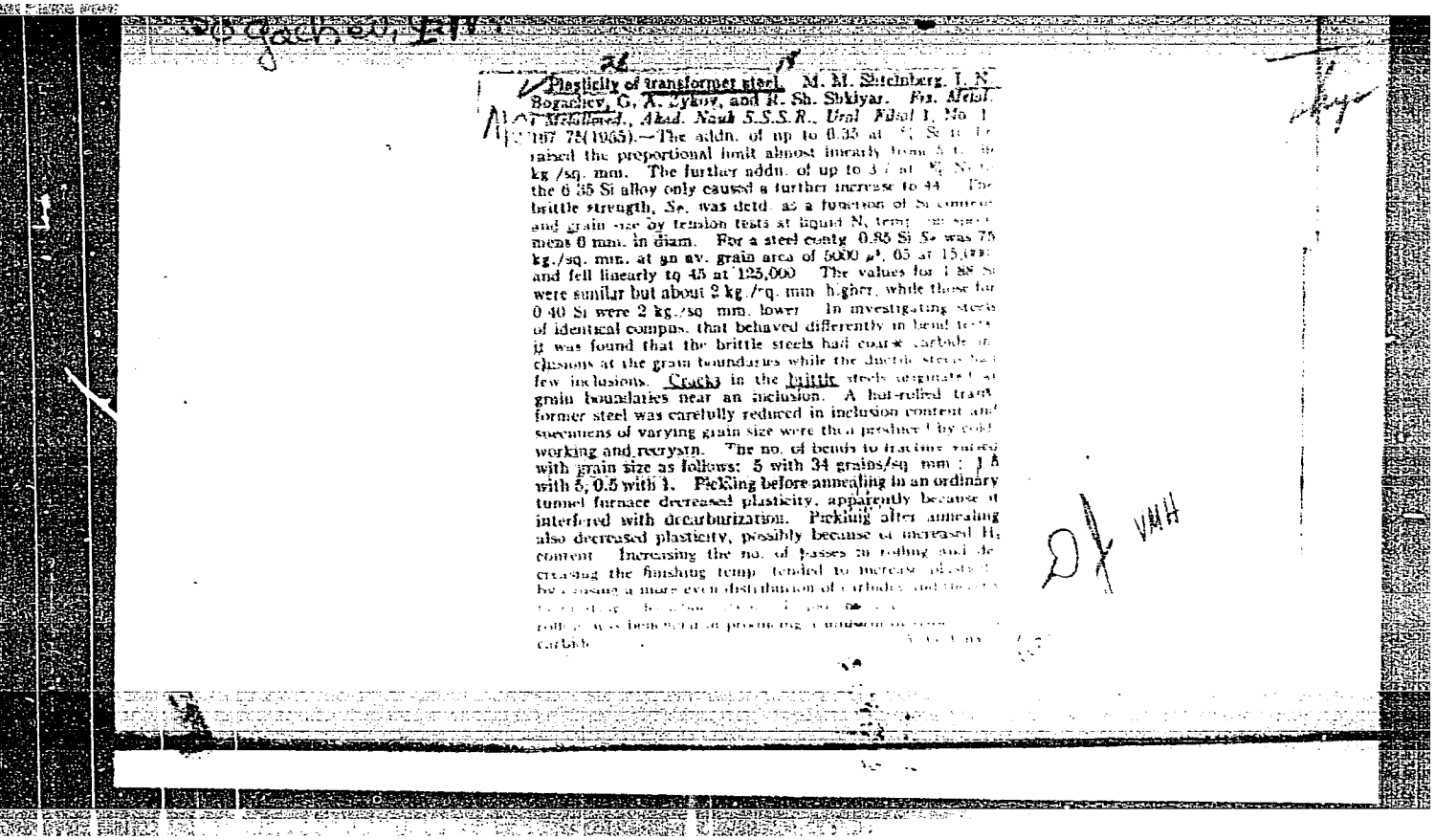
The ... in the described ... bright tempering with the ... significant economies ...



steel NH_3 were given a second anneal at 850° in a jack in an iron container, H_c increased from about 0.36 to 0.52 persisted even though the C decreased from 0.018 to 0.013%. Microstructural studies showed that the cause was the redistribution of part of the cementite from the grain boundaries to the center of the grains. A second anneal at 850° in vacuum on the other hand did not change H_c even

part of the cementite was present
mens were decarburized from 0.015% C to 0.003 by being heated in H_2 for 8 hrs. at 1200°. Later annealing in vacuum or in H_2 did not change H_c from its initial value of about 0.2 and did not cause any form of C to be visible in the microstructure. Tests were run to det. the influence on H_c of aging

to about 0.6 and
720 hrs. At an aging temp. of 540°, H_c increased to
0.6 in 5 hrs. but by
and it stayed at this value
Ppt. particles
the 500° treatment



Plasticity of transformer steel. M. M. Shtcinberg, L. N. Bogachev, G. A. Zykov, and R. Sh. Shkiyar. *Fiz. Metal. Metallov., Akad. Nauk S.S.S.R., Ural Filial* 1, No. 1 187-78(1965).—The addn. of up to 0.35 at. % Si to Fe raised the proportional limit almost linearly from 5 to 40 kg./sq. mm. The further addn. of up to 3.7 at. % Si to the 0.35 Si alloy caused a further increase to 44. The brittle strength, S_c, was detd. as a function of Si content and grain size by tension tests at liquid N, temp. on specimens 6 mm. in diam. For a steel contg. 0.93 Si S_c was 75 kg./sq. mm. at an av. grain area of 5000 μ^2, 65 at 15,000, and fell linearly to 45 at 125,000. The values for 1.88 Si were similar but about 2 kg./sq. mm. higher, while those for 0.40 Si were 2 kg./sq. mm. lower. In investigating steels of identical compns. that behaved differently in bend tests it was found that the brittle steels had coarse carbide inclusions at the grain boundaries while the ductile steels had few inclusions. Cracks in the brittle steels originate at grain boundaries near an inclusion. A hot-rolled transformer steel was carefully reduced in inclusion content and specimens of varying grain size were then produced by cold working and recrystn. The no. of bends to fracture varied with grain size as follows: 5 with 34 grains/sq. mm.; 3 with 5, 0.5 with 1. Pickling before annealing in an ordinary tunnel furnace decreased plasticity, apparently because it interfered with decarburization. Pickling after annealing also decreased plasticity, possibly because of increased H_2 content. Increasing the no. of passes in rolling and decreasing the finishing temp. tended to increase plasticity by causing a more even distribution of carbides and inclusions. [illegible] rolling was beneficial in promoting a uniform distribution of carbide[illegible]

Bogachev, I.N.

GULYAYEV, Aleksandr Pavlovich; BOGACHEV, I.N., doktor tekhnicheskikh nauk, professor, retsenzent; KUNYAVSKIY, kandidat tekhnicheskikh nauk, dotsent, redaktor; PETROV, I.A., redaktor; ZUDAKIN, I.M., tekhnicheskiy redaktor.

[Physical metallurgy] Metallovedenie. Izd. 3-e, perer. Moskva. Ges. izd-vo ober.promyshl., 1956. 343 p. (MLRA 9:6)
(Physical metallurgy)

Bogachev, I.N.

USSR/Phase Transformation in Solid Bodies. E-6

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11732

Author : Bogachev, I.N.
Inst :
Title : On the Mechanism of Formation of Globular Graphite in Gray Cast Iron.

Orig Pub : Sverdlovsk, Mashgiz, 1956, 214-221

Abstract : A critical survey of the existing theories of globularization of graphite and the justification of the author's theory, according to which the formation of globular graphite can be explained by the features of the conditions under which the eutectic is crystallized. When the liquid phase is supercooled, the fluctuations of the composition cause the formation and independent growth of austenite and graphite crystals. The eutectic crystallization proper begins when an austenitic shell is formed around the graphite, similar to the formation of "hoops" according

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BOGACHEV, I. N.

PHASE I BOOK EXPLOITATION 745

Bogachev, Ivan Nikolayevich, Doctor of Technical Sciences, Professor

Sekret bulata (The Secret of Damascus Steel) Moscow, Mashgiz, 1957. 89 p. (Series: Iz istorii mashinostroyeniya na Urale, vyp. 1) 4,000 copies printed.

Ed.: Sustavov, M.I., Engineer; Tech. Ed.: Dugina, N.A.; Editorial Board of Series: Aleksandrov, A.I., Candidate of Technical Sciences; Sadovskiy, V.D., Doctor of Technical Sciences; Volskov, A.A., Candidate of Historical Sciences; Dovgopol, V.I., Engineer; Kozlov, A.G., Senior Scientific Worker, Archives Section; and Yasenev, D.A., Engineer.

PURPOSE: The book is intended for engineers, technicians, scientific workers, researchers, students of mechanical engineering and metallurgists.

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The Secret of Damascus Steel 745

COVERAGE: The author bases this book on an investigation of the printed works of Pavel Petrovich Anosov (1799-1851), on documents from various archives and on historical and literary sources. P.P. Anosov was a mining engineer with the rank of general, who initiated the developments of methods for producing high-quality Damascus steel at the Ural Steel Works in the town of Zlatoust, famous for Zlatoust sabers. Anosov also worked as a geologist for the mining industry and he worked in machine building. He was one of the organizers of the mining industry in the Ural region in the first half of the 19th century. His ideas have been further developed during the Soviet regime. There are 32 Soviet references.

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AVAILABLE: Library of Congress (TJ86.U719)

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Bogachev, I.N.

KUDRYAVTSEV, I.V., doktor tekhnicheskikh nauk, professor; SAVVINA, N.M.; BARANOVA, N.B., kandidat tekhnicheskikh nauk; BALABANOV, N.A.; BOGACHEV, I.N., doktor tekhnicheskikh nauk, professor, retsenzent; KLOCHNEV, N.I., kandidat tekhnicheskikh nauk, redaktor; SIROTIN, A.I., inzhener, redaktor izdatel'stva; MATVEYEVA, Ye.N., tekhnicheskiy redaktor

[Structural strength of nodular cast iron] Konstruktsionnaia prochnost' chuguna s sharovidnym grafitom. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1957. 158 p. (Cast iron) (MLRA 10:6)

BOGACHEV, I.

ZAKHAROV, Boris Petrovich; BOGACHEV, I.N., prof. doktor tekhn.nauk, retsenzent; RYBIN, V.V., inzh., retsenzent; KARPEYEV, I.Ye., inzh., retsenzent; DUGINA, N.A., tekhn.red.

[Heat treatment of metals] Termicheskaia obrabotka metallov. Moskva, Gos. nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1957. 302 p.
(Metals--Heat treatment) (MIRA 11:2)

[redacted] doktor tekhnicheskikh nauk, retsenzent; GORSHKOV, A.A., doktor tekhnicheskikh nauk, retsenzent; SAMOYLOV, S.I., professor, retsenzent; ZHUKOV, P.A., kandidat ekonomicheskikh nauk, retsenzent; PAL'MOV, Ye.V., doktor tekhnicheskikh nauk, redaktor; SOKOLOVSKIY, V.I., kandidat tekhnicheskikh nauk, redaktor; SARAFANNIKOVA, G.A., tekhnicheskiy redaktor

[Improving quality and operating economy of machines] Povyshenie kachestva i ekonomichnosti mashin. Pod red. E.V.Pal'mova i V.I. Sokolovskogo. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1957. 626 p. (MLRA 10:9)

1. Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Sverdlovskoye otdeleniye
(Machinery industry)

67417

SOV/123-59-12-46684

18.7100

Translation from: Referativnyy zhurnal. Mashinostroyeniye, 1959, Nr 12, pp 108-109 (USSR)

AUTHORS: Senkevich, V.F., Bogachev, I.N.

TITLE: Isothermic and Staggered Hardening of Steel

PERIODICAL: V sb.: Materialy Nauchno-tekhn. konferentsii po probl. zakalki v goryachikh sredakh i promezhutochn. prevrashcheniyu austenita. Vol 1, Yaroslavl', 1957, pp 119-132

ABSTRACT: The properties of 45 Kh, 45G2 and 37KhS steel grades and of 18KhNVA and 20Kh2N4A high alloy cemented steels are investigated after heat treatment in molten alkali. 45Kh steel was oil-hardened at 860°C with subsequent annealing at 500 - 550 - 600 - 650°C and isothermic hardening in molten alkali in the temperature range of the second phase of supercooled austenite decomposition at 375 - 400 - 425 - 450°C. The smelts of 45Kh steel showed extremely individual features. When being oil-hardened, a distinct difference in the magnitude of a_k can be observed between individual smelts at annealing temperatures of 500 and 600°C. Isothermic treatment at 425 - 450°C increases a_k after annealing. Hardening at supercooling temperatures

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of 160 - 180°C warrants the same level of mechanical properties as oil-hardening, if annealed to the same degree of hardness. 4502 steel possesses a high a_k after hardening in molten alkali and annealing at 550 - 650°C. Oil hardening of 37 KhS steel and supercooled hardening at 160 - 180°C result, at equal annealing temperatures, in the same level of mechanical properties. Isothermic hardening of 37KhS steel, carried out at 350 - 375°C, ensure a sufficiently high a_k, but, deviating from the optimum supercooling conditions, it is accompanied by an abrupt increase in the threshold of cold brittleness. Staggered hardening at supercooling temperatures of 180 - 200°C with 15 - 20 minutes soaling in the abth is an efficient method of hardening 18KhNVA and 20Kh2N4A steels in molten alkali. 6 figures, 4 references.

S.A.I.

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S/123/59/000/010/029/068
A004/A001

Translation from: Referativnyy zhurnal, Mashinostroyeniye, 1959, No. 10, p. 114, # 38062

AUTHORS: Bogachev, I.N., Mints, R.I.

TITLE: The Combination of Heat Treatment and Oxide Coating in Molten Oxidizers

PERIODICAL: V sb.: Materialy Nauchno-tekhn. konferentsii po probl. zakalki v goryachikh sredakh i promezhutochn. prevrashcheniyu austenita. 1. Yaroslavl', 1957, pp. 265-270

TEXT: The combination of hardening and tempering with the oxide-coating process makes it possible to obtain components which do not only possess high mechanical properties but are also highly corrosion-resistant. The melts of the NaOH - $NaNO_3$ and NaOH - $NaNO_2$ systems have a minimum melting point of 250-260°C and can be used for temperature ranges in which the oxide coating process can be combined with isothermal and stepped hardening or tempering. The optimum composition with which the oxide film possesses the highest corrosion resistance

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The Combination of Heat Treatment and Oxide Coating in Molten Oxidizers

is 80% NaOH + 20% $NaNO_3$. In the melt composed of NaOH + $NaNO_3$ + $NaNO_2$ the oxide film does not acquire a higher corrosion resistance, but the melt consisting of three chemicals has a longer operation life than melts of only two chemicals. The anticorrosion properties of the obtained oxide films are determined by the first minutes of the oxidation process. The optimum duration of oxide coating at 400°C is 20-30 min, while at a temperature of 500°C it is 10-20 min. The optimum temperature ensuring an increase in the corrosion resistance of machine parts by 6-7 times is 400-500°C, while a treatment at 300° results in an increase in corrosion resistance by 3-4 times. There are 4 figures and 9 references.

S.A.I.

Translator's note: This is the full translation of the original Russian abstract.

BOGACHEV, I.N.

BOGACHEV, I.N., doktor tekhnicheskikh nauk, professor; GITEL'ZON, Ya.M., inzhener; POGREBETSKAYA, T.M., inzhener; YURGENSON, A.A., inzhener.

Investigating the cavitation and erosion resistance of the 38KhMIUA zinc coated and nitrided steel. Vest.mash. 37 no.9:24-26 S '57. (MLRA 10:9)

(Steel--Testing)

129-2-10/11

AUTHORS: Bogachev, I.N., Grozin, B.D. and Gulyayev, A.P., Doctors of Technical Sciences, Professors.

TITLE: Scientific and Technical Conference on Heat Treatment of Metals Held in Warsaw (Nauchno-tekhnicheskaya konferentsiya po termicheskoy obrabotke metallov v Varshave)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.2, pp. 52 - 55 (USSR).

ABSTRACT: The Polish Society of Mechanical Engineers convened a conference for October 7 - 8, 1957 on heat treatment of metals, in which about 1 500 people participated from Poland and there were also delegates present from the Soviet Union and East Germany.

S. Przegalinski read a paper on "The Principles of Selection of Alloy Structural Steel"; this author believes that excessive importance is attached to ductility properties and considers that important criteria in selecting structural steels are the structure in the hardened state and also the hardness distribution along the cross-section. The authors of this report do not fully agree with some of the opinions expressed in this Polish paper.

Prof. A.P. Gulyayev read the paper "Isothermal Transformation of Austenite in High-speed Steel" which was originally published

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Scientific and Technical Conference on Heat Treatment of Metals Held in Warsaw.

in No.12, 1956, of this journal. At the sectional meeting, A. Moszczynski and G. Matyj read the paper "Chemical-heat Treatment Inside Liquid Media Using Induction Heating" which attracted great attention; they described a simple method consisting of submersion of the inductor and a specimen into a liquid which contained the elements necessary for saturating the steel. After heating of the specimens by the current, the liquid surrounding the specimen starts to evaporate and forms a vapour shell; the vapour decomposes, forming elements in the atomary state which are absorbed by the surface of the steel and diffused into the steel. The inductor voltage must be so chosen that thermal equilibrium is reached and the desired isothermal process is obtained. Some results relating to case-hardening, nitriding and cyaniding are mentioned in the paper.

L. Kalinowski read the paper "Carbon Balance During Gas Cementation"; according to his calculations, only 2 - 4% of the carbon which streams into the furnace is absorbed by the metal, 36-50% is removed with the gases and 42 - 60% settles as soot.

Scientific and Technical Conference on Heat Treatment of Metals Held in Warsaw.

W. Witek read the paper "Gas Cementation by means of Liquid Hydrocarbons".
S. Kowal read the paper "Cementation of Steel by means of Natural Gas".
Two papers were devoted to heat treatment of case-hardened steels, namely:
J. Wyszkowski read the paper "Heat Treatment of Case-hardened Steels Taking Into Consideration the Grain Size", showing that the heat treatment after case-hardening should be determined by taking into consideration the grain size.
Z. Leszczynski, J. Lemnicka and J. Lemnicki read the paper "Chemico-thermal Treatment of Gears".
E. Zmichorski read the paper "Heat Treatment of Long Tools Made of High-alloy Steels", describing an original design of an electrode-salt bath for heating prior to hardening of reamers made of high-speed steel, a sketch of which is shown in Fig.4, p.54.
G. Prignic read the paper "Heat Treatment of Accurate Metering Gauges".
S. Jablonski read the paper "Possibility of Applying Controlled Atmospheres for Heat Treatment in the Polish Industry".

Scientific and Technical Conference on Heat Treatment of Metals Held in Warsaw.

P. Kosieradski read the paper "Cyaniding Bath".
B. Korwadynski, S. Jablonski and Prof. B. Sachir and J. Madian read the paper "Equipment of Heat Treatment Shops and Heat Treatment Furnaces".
S. Orzechowski read the paper "Application of the Method of Mikved during Control Tests of Steel Components".
M. Kozlowski read the paper "Comparison of the Properties of Components which were Heat-treated by Surface-hardening and by Chemico-thermal Methods"
Dotsent E. Zmachorski read the paper "Influence of Magneto-striction Oscillations on the Changes of the Structure and the Properties of Hardened Steels"; he investigated high-carbon steels with 1.13 - 1.60% carbon, containing 1.3-2.8% chromium and no chromium.
Prof. F. Sztaub read the paper "Microhardness and Structural Components of Induction-hardened, High-speed Steels", showing that the microhardness of the carbide phase changes as a function of the heat treatment regime (Fig.5).
Ya. Tymowski read the paper "Comparison of the Properties of Structural Steels Improved by Heat Treatment and of Isothermally-hardened Structural Steels", in which he analyses literary data.

Scientific and Technical Conference on Heat Treatment of Metals Held in Warsaw.

He showed that alloy steels containing carbide-forming elements have higher creep values at 350 - 550 °C after isothermal heat treatment to obtain acicular troostite.

There are five figures.

AVAILABLE: Library of Congress

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SOV/137-58-9-19913

Translation from: Referativnyy zhurnal, Metallurgiay, 1958, Nr 9, p 260 (USSR)

AUTHORS: Bogachev, I.N., Mints, R.I.

TITLE: Effect of Alloying Upon the Cavitation Erosion Strength of Nodular Cast Iron (Vliyaniye legirovaniya na kavitatsionno-erozionnuyu stoykost' chuguna s sharovidnym grafitom)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chernaya metallurgiya, 1958, Nr 2, pp 71-75

ABSTRACT: An erosion shock stand is used to study the cavitation erosion strength (CES) of unalloyed and alloyed nodular cast irons containing: a) 1% Ni and 0.28% Mo, b) 8.3% Ni, and c) 15.4% Ni. It is established that Ni-Mo iron quenched from 850°C has considerably higher CES than unalloyed iron. Ni irons (with 8.3 and 15.4% Ni) have the maximum CES and have a microstructure consisting of spicular products of austenite decomposition, but their CES is considerably lower than that of Ni-Mo iron.

E.Sh.

1. Cast iron--Erosion 2. Iron--Erosion 3. Metals --Testing equipment

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ASSOCIATION — URAL'SKIY POLITEKHNICHESKIY INSTITUT.

BOGACHEV I.N.

122-2-29/33

AUTHOR: Draygor, D.A., Candidate of Technical Sciences

TITLE: The Third Scientific and Technical Conference in Kiyev on the Improvement of the Wear Resistance and Service Life of Machines (Tret'ya Kiyevskaya nauchno-tekhnicheskaya konferentsiya po povysheniyu iznosostoykosti i sroka sluzhby mashin)

PERIODICAL: Vestnik Mashinostroyeniya, 1958, No.2, pp. 81-82 (USSR).

ABSTRACT: The conference was organised by the Kiyev region of the NTO Mashprom (The Scientific and Technical Organisation of the Mechanical Engineering Industry) and by the Institute of Mechanics of Building Structures, Ac.Sc. Ukrainian SSR (Institut stroitelnoy mekhaniki AN USSR). 430 delegates representing the major institutions of the Ac.Sc. USSR and of the Ukrainian SSR, the specialised research agencies and the large Soviet plants heard and discussed 90 papers devoted to the study of the mechanism of disintegration of surface layers in machine components and to new methods of improving the wear life of components.

In a paper by Academician S.V. Serensen, entitled "Endurance Related to Wear and Fatigue", a survey of Russian and foreign studies was given with emphasis on fatigue failures caused by wear, both as a result of the mechanical consequences due to

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The Third Scientific and Technical Conference in Kiyev on the Improvement of the Wear Resistance and Service Life of Machines

unequal wear and the formation of clearances in assemblies and as a result of a change in the physical and chemical condition of contact surfaces.

R.D. Grozin, Corresponding Member of the Ac.Sc. Ukrainian SSR, in a paper entitled "The Complex Method of Analysis of Components Working Under the Conditions of Rolling Friction" presented a method which includes the combined use of electron microscope, X-ray diffraction and spectroscopic analyses to judge the condition of the surface layers in association with wear tests and static mechanical tests under tri-axial non-uniform compression at different temperatures. It is claimed that with the help of this method, the relation between the contact endurance strength of steel and the factors defining the condition of the surface can be established.

In a paper "On Temperature Measuring Methods in the Friction Process between Solid Bodies", by S.A. Sukhov, Candidate of Technical Sciences, a method for measuring the temperature gradients in the immediate vicinity of the friction surfaces with the help of a natural thermocouple was presented. Both sliding bodies (pin and ring) are made of the same material, but the pin end face is covered with a thin layer of another metal

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which constitutes the natural thermocouple of which one junction is the sliding surface and the other is the bond between the pin face and the coating metal.

Great interest was aroused by the paper "The Variation of Wear Resistance of Certain Anti-friction Alloys under Nuclear Radiation" by B.L. Slin'ko. Precipitation-hardening alloys (beryllium copper Б2 and nickel silicon bronze Bp. KH 1-3) have their strength and wear resistance increased by nuclear radiation. Alloys changing their properties mainly as a result of phase transformations and having a higher re-crystallisation temperature change their properties insignificantly.

In a paper "Foundations of the Cavitation-erosion Failure of Ferrous Alloys", I.N. Bogachev, Doctor of Technical Sciences, and R.I. Mints, Candidate of Technical Sciences, generalised the studies of the effect of the chemical and phase composition of iron carbon alloys on their cavitation erosion resistance. Increasing the carbon content from 0.023 to 1.2% improves the erosion resistance. The effect of alloying is due solely to the metallographic structure obtained. A pronounced improvement of erosion resistance is obtained in spheroidal graphite cast iron

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by alloying with 1% nickel and 0.3% molybdenum.
Engineer L.A. Chatynyan in his paper "Investigation of the Wear of Nickel Alloys under Dry Friction at Elevated Temperatures", reported the results of his test which showed nickel alloys to have the best wear resistance at high temperatures, whilst the initial hardness is of little consequence. The optimum composition of a new alloy with a high wear resistance at 400 °C was given, whilst high-speed steel and ordinary chromium steels have little wear resistance under dry friction at high temperatures.
V.P. Grechin, Candidate of Technical Sciences, concluded in his paper "The Heat Resistance of Cast Iron as the Main Factor in its Wear Resistance under Sliding Friction" that the hardness of cast iron at high temperatures (up to 850 °C) determines its wear resistance. Based on numerous studies of various cast irons, recommendations for alloying and for the application of cast irons under different conditions were given.
It was noted by N.I. Kovalenko, Candidate of Technical Sciences, in his paper "The Wear Resistance of Wire Ropes" that the rubbing down of a wire rope is caused by an abrasive medium and its failure occurs before fatigue sets in. The author recommended

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the deposition of anti-friction metals such as cast iron or aluminium upon steel pulleys. In unlubricated operation, such deposits increase the wear life of wire ropes by a factor of 2-3. I.I. Frumin, Candidate of Technical Sciences, in his paper "Alloys for Wear-resistant Hard Facing Deposits", stated the theoretical basis and methods of alloying to obtain the desired results and surveyed the fields of application of different methods of deposition on wearing components.
In his paper, "Electric Slag Method of Hard Facing for Wear Resistance", I.K. Pokhodnya, Candidate of Technical Sciences, suggested the electric slag process for hard facing of different components and concluded that this method is appropriate when large quantities of metal have to be deposited or when large numbers of components require treatment.
M.V. Simonenko, Engineer, suggested in his paper "The Electrolytic Diffusion Method of Making Bi-metal Components" a novel method of manufacturing copper base alloys. The alloying proceeds at a temperature much below the fusion temperature of copper. Great economies are achieved in labour cost and in scarce metals. Small scale and automatic production procedures can be applied. Service

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tests have confirmed reliable operation of bi-metal components under different conditions.

In a paper "Electric Spark Hardening of Machine Components", S.S. Astaf'yev, Candidate of Technical Sciences, reported on a novel electric spark hardening process. The surface of the steel is alloyed with the electrode metal, as a result of instantaneous heat impulses occurring in rapid succession during spark discharges. A special treatment head makes high output possible. The wear resistance of machine components is said to increase 2-6 times at room temperatures and 4-5 times at elevated temperatures.

In a paper "New Anti-friction Materials and Coatings", I.Ya. Al'shits reported on work designed to evolve novel substitutes for babbitt and high-tin-content bronze alloys. The following have given good results: a) Moulded timber materials and plastics based on phenolic and other resins with different fillers (cord and cotton fibres and others), in conjunction with water lubrication. b) Metallised graphite, nylon and others for elevated temperatures. c) Graphite-loaded materials and compositions of resin and graphite for working in corrosive media.

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"Improvement in Wear Resistance and Service Life of Components with Large Transverse Cross-sections by the Method of Surface Quenching and Accelerated Heating in Heat Treatment Furnaces" was the subject of G.T. Fomin, Candidate of Technical Sciences, who reported that accelerated heating of steel components to achieve transition into an austenitic state for the surface layer alone makes it possible to intensify the heat treatment of components with a cross-section exceeding 40 mm. The depth of the quenched layer can be controlled without modifying the structure of the core, so achieving the best combination of wear resistance and impact strength.
N.S. Dombrovskaya, Doctor of Chemical Sciences, and Yu.M. Vinogradov, in a paper "The Improvement of the Anti-friction Properties of Metals by Means of Thermo-Chemical Surface Treatments", pointed out that, alongside nitriding and phosphating, steels can also be improved in their anti-friction properties by enrichment with chloride or sulphide on their surface. The latter methods mainly improve the anti-seizure properties, whilst the former improve wear resistance. Sulphiding can be achieved in solid, liquid and gaseous media;

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chloriding, in a gaseous medium at a temperature of about 200 °C.

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AUTHORS: Bogachev, I. N., Mints, R. I. SOV/163-58-3-35/49

TITLE: The Effect of the Chemical Composition and the Phase Composition on the Resistivity of Steels to Cavitation and Erosion (Vliyaniye khimicheskogo i fazovogo sostava na kavitatsionno-erozionnuyu stoykost' staley)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 3, pp 215 - 219 (USSR)

ABSTRACT: In the present paper the results obtained in the investigations of the effect of the chemical composition and the phase composition on the cavitation and erosion stability of steels are given. The effect of carbon on the erosion and cavitation stability shows that with an increase of the carbon content the erosion and cavitation stability of steel increases. A steel sample with 0,4% carbon has the highest stability in this respect. Steel samples of the same hardness and of different structure have a different stability. Also the other elements in steel effect this stability of steels. From the results obtained may be concluded that in the thermal

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The Effect of the Chemical Composition and the Phase Composition on the Resistivity of Steels to Cavitation and Erosion

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treatment of structural steels a uniform structure is required to reach a practically uniform erosion and cavitation stability. There are 5 figures and 1 table.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

SUBMITTED: October 21, 1957

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129-58-8-5/16

AUTHORS: Bogachev, I. N., Doctor of Technical Science, Professor and Mints, R. I., Engineer

TITLE: Role of the Grain in the Cavitation-Erosion Failure of Steel (Rol' zerna v kavitatsionno-erozionnom razrushenii stali)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 8, pp 26-29 (USSR)

ABSTRACT: Literature does not contain adequate information on the influence of the grain size and grain boundaries on the cavitation-erosion failure of steel. Therefore, in this paper the influence is investigated of the size and the character of the grain and also of its boundary on the cavitation-erosion stability. The tests were carried out on an impact-erosion test stand. The speed of rotation of the specimens was 78 m/sec, the water pressure 0.28 atm, the diameter of the outflow nozzle 8 mm, the distance d = 1.4 mm. The graph, Fig.1, indicates that with decreasing grain size the cavitation-erosion stability of steel with a homogeneous structure (ferrite and austenite) decreases. The cavitation-erosion stability is greatest if the grain size is largest. According to

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Role of the Grain in the Cavitation-Erosion Failure of Steel

metallographic analysis, the cavitation-erosion failure of ferrite and austenite begins along the grain boundaries (Fig.2); with the progress of time the boundaries begin to fail completely and, following that, the grain breaks. Thus, the smaller the grain the larger will be the size of the boundaries and the lower will be the cavitation-erosion stability of the studied structures. The results on the influence of the grain size on the cavitation-erosion stability of heterogeneous structures (Steel 40, U8 and U12) are graphed in Fig.3. The influence of the character of the grain and the grain network on the cavitation-erosion stability of the steel U12 is graphed in Fig.6 and the influence of the speeds of cooling after tempering at 650°C on the cavitation-erosion stability of the steel 35KhGSA is graphed in Fig.7; the latter steel has a considerably lower cavitation-erosion stability in the brittle state than in the tough state. Thus, it can be concluded that the cavitation-erosion stability of steels depends on the size of the grain, the character of the grain boundaries

and the body of the grain. The intensity of the failure

129-58-8-5/16

Role of the Grain in the Cavitation-Erosion Failure of Steel

is determined by a combination of the properties of the grain and its boundaries. The obtained results indicate that it is necessary to establish the relation between the cavitation-erosion stability of the steel and the properties which are associated with its fine structure. There are 7 figures and 5 references, all of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut imeni Kirova (Ural Polytechnical Institute imeni Kirov)

1. Grains (Metallurgy)--Metallurgical effects 2. Steel--Erosion
3. Steel--Mechanical properties 4. Steel--Test methods

Card 3/3

BOGACHEV, I.N., prof., doktor tekhn.nauk; REZHETNYAK, Kh.E., inzh.

Plasticity of hardened and tempered steel. Izv.vys.ucheb.zav.; chern.met. no.8:127-132 Ag '58. (MIRA 11:11)

1. Ural'skiy politekhnicheskiy institut.
(Steel--Testing) (Deformations (Mechanics))

BOGACHEV, I.N.; DRUZHININA, L.P.

Graphitization of cementite. Trudy Ural. politekh. inst. no.68:34-37 '58. (MIRA 12:7)

(Cast iron--Heat treatment)
(Cementite) (Phase rule and equilibrium)

BOGACHEV, I.N.; MINTS, R.I.

Investigating the oxidation process of steel in molten salts and alkalies. Trudy Ural. politekh. inst. no.68:71-80 '58.
(MIRA 12:7)

(Steel—Hardening) (Oxidation)

SOV/137-59-3-6422

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 212 (USSR)

AUTHORS: Bogachev, I. N., Zhuravlev, L. G.

TITLE: Certain Laws of the Abrasive Wear of Steel (Nekotoryye zakonomernosti abrazivnogo iznashivaniya stali)

PERIODICAL: Tr. Ural'skogo politekhn. in-ta, 1958, Nr 68, pp 81-87

ABSTRACT: The wear resistance (WR) of 19 cast steels of the types Kh, KhS, KhSN, KhGSNM, and KhN2F containing 0.20-0.50% C was investigated by the Khrushchov method. It was established that, other conditions being equal, the WR of steel is a function of its H_V value and of its structure. A linear relationship between the WR and the H_V value is observed only within one and the same structure. Lamellar structures exhibit a greater WR than the structures produced by tempering of martensite and possessing an identical H_V value. The WR is significantly affected by the C content; whereas Si increases the WR, Mo, Mn, and Cr do not affect it.

I. B.

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3(7) PHASE I BOOK EXPLOITATION SOV/3485

Bogachev, Ivan Nikolayevich, and Rafail Isaakovich Mints

Kavitatsionnoye razrusheniye zhelezouglerodistykh splavov (Cavitation Damage to Iron-Carbon Alloys) Moscow, Mashgiz, 1959. 109 p. 3,500 copies printed.

Reviewers: M. A. Aksel'rod, Engineer, and E. E. Blyum, Engineer; Ed.: E. L. Kolosova, Engineer; Tech. Ed.: N. A. Dugina; Exec. Ed. (Ural-Siberian Division, Mashgiz): A. V. Kaletina, Engineer.

PURPOSE: This book is intended for engineers and scientific workers studying the cavitation resistance of metals.

COVERAGE: This book is a study of the damage to iron-carbon alloys caused by cavitation. The book contains materials published as a result of a systematic study of cavitation metallography. It outlines efforts made to prevent cavitation of metal and analyzes the causes and mechanism of corrosion. Methods and equipment used for determining the cavitation resistance of alloys are described. Deformations caused by hydraulic shocks are analyzed, and comparisons of the cavitation resistance of iron, steel of different types, and other alloys are made. Problems of increasing the cavitation resistance of machine

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Cavitation Damage (Cont.)

parts are discussed and a number of suggestions offered. Experiments were conducted with the help of Engineers N. V. Murnina, T. M. Petukhova, L. D. Slyusareva, and degree students D. Yemlevskaya, R. Korovina, G. Loginova, N. Anfimova, R. Dovbenko, T. Vostrotina, and Sh. Verkhoglazov. There are 70 references: 54 Soviet, 10 English, 5 German, and 1 French.

TABLE OF CONTENTS:

Cavitation Damage (Cont.)

Cavitation Damage (Cont.)

AVAILABLE: Library of Congress

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TM/lsb
4-26-60

BOGACHEV, I.N.

18(5) PHASE I BOOK EXPLOITATION SOV/2048

Sverdlovsk. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova

Teoriya i praktika liteynogo proizvodstva (Theory and Practice in the Foundry Industry) Moscow, Mashgiz, 1959. 231 p. and 32 p. (Series: Its: [Sbornik] vyp. 89) Errata slip inserted. 5,000 copies printed.

Ed.: A.A. Gorshkov, Corresponding Member, USSR Academy of Sciences, Doctor of Technical Sciences, Professor; Tech. Ed.: N.A. Dugina; Exec. Ed. (Ural-Siberian Division, Mashgiz): A.V. Kaletina, Engineer.

PURPOSE: This book is intended for engineering and scientific workers of institutes and machine-building plants, as well as for students of advanced courses at vuzes.

COVERAGE: This collection consists of articles dealing with practical problems in foundry processes. The articles review the achievements of Ural foundry workers in the past 40 years and present aspects of a current study on the casting of nodular cast iron, its properties and casting methods. A description is given of artistic and architectural casting. Consideration is given to the problem of combatting gases in steel and aluminum. The structure of cast steel is discussed. A recent investigation of vacuum casting including its characteristic properties and new applications is also presented. There are 32 pages of photographs illustrations at the end of the book. No personalities are mentioned. References follow each article.

TABLE OF CONTENTS:

18(3), 18(7)
AUTHORS: Bogachev, I. N., Rubel', I. S. SOV/163-59-1-37/50

TITLE: Microvolume Transformations of Low-carbon Silicon Steel (Prevrashcheniya v mikroob"yemakh v nizkouglerodistoy kremnistoy stali)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 1, pp 189-195(USSR)

ABSTRACT: This is an investigation of transformations occurring during the heating and cooling in samples of transformer iron with a carbon content varying from 0.01 to 0.05%. Heating and cooling operations were carried out in baths. The samples were protected against decarburization by nickel plating. When the samples were heated to 650° in a bath a dissolution of the carbides in the alpha-solution was observed already after a halting time of one hour. At higher temperature the carbides dissolve even faster. At 800° and above undissolved carbides are found in the structure after hardening, if the halting time is prolonged. They exhibit a dark rim with a troostite-like structure. If heating is carried through to 950° the grainy carbides and the fragments of the grain boundary zementite quickly dissolve during halting times of a few seconds. In the range of from

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950-1150° austenite regions are formed at the boundaries of the ferrite grains where they are in contact with the carbides. In this temperature range austenite is in equilibrium with ferrite (in the biphase region). After a sufficiently long halting time the austenite spheriodizes to a relatively small extent and afterwards remains in a globular form. Even if the halting times are very long the austenite is not absorbed by the basic mass of the alpha-solution. If quenching (in hardening) is employed, this globular austenite transforms into a martensite structure. If cooling proceeds slowly coarse zementite inclusions are formed at the grain boundaries. If in the structure of transformer iron comparatively coarse carbides are contained, an intermediate transformation, the formation of graphite, is observed. This graphite can also be dissolved, but only at a heating to a temperature exceeding that required for zementite dissolution. Thus the structural analysis furnishes accurate results, whereas the application of physical methods does not provide satisfactory information. The transformations during cooling were investigated with samples which after heating to 1000° with a halting time of 10 minutes were cooled

Microvolume Transformations of Low-carbon Silicon Steel SOV/163-59-1-37/50

in baths with 450-700° and afterwards quenched in water. The carbon content of the steel was 0.015 to 0.06%. The diagrams obtained show that a reduction of the carbon content leads to an increase of the stability of the alpha-solution and to a retardation of the separation of carbides. The nature of the carbide formations varies greatly in accordance with the undercooling of the alpha-solution. Finely grained carbides have the most detrimental influence. They lead to a considerable increase of the coercive force. Hence in the heat treatment of transformer iron it must be attempted to obtain the stipulated finely grained structure and the stipulated distribution, or to decarburize the steel as much as possible. There are 5 figures and 3 references, 1 of which is Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural'skiy Polytechnical Institute)

SUBMITTED: April 11, 1958

Card 3/3

18(3) SOV/148-59-2-14/24

AUTHOR: Bogachev, I.N., Doctor of Technical Sciences, Professor

TITLE: Letter to the Editor (Pis'mo v redaktsiyu)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 1959, Nr 2, pp 108-109 (USSR)

ABSTRACT: With reference to the discussion on graphitization of steel and cast iron between V.F. Zubarev and K.P. Bunin the author rejects the theory developed by Zubarev. In his opinion, Zubarev, who supports the theory on the direct decomposition of iron carbide and graphite formation is wrong, as his statements are not confirmed by experiments.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

Card 1/1

Bogachev y. I. N.

S/129/60/000/06/019/022
E073/E535

AUTHOR: Mints, R. I., Candidate of Technical Sciences

TITLE: All Union Scientific-Technical Seminar on Improving the Cavitation Resistance of Components, Sverdlovsk

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, Nr 6, pp 58-60 (USSR)

ABSTRACT: The seminar was held at the initiative of the Problems Laboratory for Metallurgy at the Ural Polytechnical Institute imeni S. M. Kirov jointly with other organizations. In the seminar representatives of research establishments and works from Sverdlovsk, Perm', Chelyabinsk, Barnaul, Gor'kiy, Odessa, Leningrad, Yerevan, Murmansk, Khar'kov and other places participated. This report gives brief summaries of the following papers which were read:
G. D. Ter-Akopov, Candidate of Technical Sciences, "Cavitation failures in hydraulic turbines";
L. I. Ponarskiy, Engineer, "Cavitation in hydraulic turbines"; M. I. Kurasevich, Engineer, "Cavitation failures in runners of centrifugal pumps"; Marinin, A.A., Engineer, "Cavitation failures in marine propellers";

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N. N. Ivanchenko, Candidate of Technical Sciences, "Cavitation failures in diesel engines"; A.P.Chervyakov, Engineer, "Increase of the cavitation-erosion stability of jacket and cylinder liners of the diesel engines D6 and D12"; I.N. Bogachev, Doctor of Technical Sciences, "Mechanism of the cavitation failure of metallic alloys and principle for the selection of such alloys"; R.I. Mints, Candidate of Technical Sciences, "Combatting cavitation failure by using surface-active additions to the liquid phase of closed syetems"; R.Sh. Shklyar, Candidate of Technical Sciences, D.D.Slyusareva, Engineer, and N.N.Syutkin, Engineer, "Structural changes in the initial stages of cavitation failure"; T.M.Petukhova, Engineer, "Influence of the structure on the resistance to cavitation of bronze"; V.V Govrenek, Candidate of Technical Sciences and D.N. Bol'shutkin, Engineer, "Cavitation erosion of metals, thermal and mechanical effects in the cavitation zone".

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BOGACHEV, I.N.

82634

S/126/60/010/02/004/020
E111/E352

18.1250

AUTHORS: Mel'nikova, V.I. and Bogachev, I.N.

TITLE: Volume Changes in the Alloy Ni_3Mn During Ordering

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol. 10, No. 2, pp 200 - 206

TEXT: It has been reported (Refs. 1-6) that transition of a nickel-manganese alloy close in composition to the stoichiometric into the ordered state is accompanied by changes in some properties. The object of the present work was to study the corresponding volume changes in a Ni_3Mn alloy (25% Mn, 0.6% Fe, 0.03% C, 0.014% S, 0.24% Si and 0.0063% P). 3-mm diameter, 50-mm long cylindrical specimens were tested on a Chevenard dilatometer with automatic recording, being used as the standard. Figs. 1 and 2 represent, respectively, relative contraction for isothermal conditions as functions of time (up to 23 hours) at various temperatures and of temperature (350-515 °C) for the various times. X-ray structural analysis by back reflection agreed with the volume changes observed. Tests were also carried out with continuous heating of the test piece: Fig. 3 shows difference between the length

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E111/E352

Volume Changes in the Alloy Ni_3Mn During Ordering

changes of the standard and the specimen as functions of temperature for different heating rates and the alloy in different initial states. From the dilatometric curves the coefficient of linear expansion of the alloy was found: this is shown as a function of temperature for the ordered alloy (lefthand graph) and for the alloy pre-ordered at 485 °C (righthand graph); the corresponding curve for the disordered alloy is shown in Fig. 5. The work confirmed the results of preliminary experiments showing that transition into the ordered state is accompanied by shrinkage. Volume-change and ordering attain greatest speed at 450 - 475 °C. It is suggested that the volume change is due to different ordering speed below $T_{o.d.}$. The order-disorder transition temperature is 475 - 520 °C. The transition leads to a sharp change in the value of the coefficient of thermal expansion in the temperature range in which the transition occurs.
There are 5 figures and 20 references: 4 Soviet, 3 German, 4 international and 9 English.

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S/126/60/010/02/004/020
E111/E352

Volume Changes in the Alloy Ni_3Mn During Ordering

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M. Kirova
(Ural Polytechnical Institute im. S.M. Kirov)

SUBMITTED: March 29, 1960

Card 3/3

18.1285

S/126/60/010/006/016/022
E193/E483

AUTHORS: D'yakova, M.A. and Bogachev, I.N.

TITLE: Decomposition of the Beta-Solid Solution in a Titanium-Manganese Alloy

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.6, pp.896-902

TEXT: The object of the present investigation was to study the kinetics of the solid state transformation taking place in a titanium-base alloy containing 6.5% Mn, 0.18% Fe, 0.07% Si, 0.05% C, 0.043% N and 0.005% H; this particular alloy having been chosen as one in which the β-phase can be retained by quenching. The experimental specimens were prepared by melting the alloy in a vacuum-arc furnace, remelting it in an argon-arc furnace, forging, rolling to the final size and then vacuum-annealing at 650°C. The kinetics of the decomposition of the β-phase were studied by the dilatometric method, hardness and electrical resistance measurements and metallographic examination. Some of the dilatometric measurements were taken on specimens quenched from 900°C and then heated at the rate of 200°C/h. Other experiments consisted in heating the specimens to 900°C,

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S/126/60/010/006/016/022
E193/E483

Decomposition of the Beta-Solid Solution in a Titanium-Manganese Alloy

transferring it to a salt bath and studying the changes of various properties as a function of the duration of the isothermal treatment. It was concluded from the results obtained that decomposition of the β-phase can take place in two temperature ranges, separated by a temperature interval within which the β-phase appears to be stable. One range extends from 420°C up to the temperature of the polymorphic transformation, and decomposition of the β-phase at these temperatures leads to the formation of the α-phase. The second range extends from 150 to 400°C, the product of decomposition in this case being an intermediate ω-phase. In the 420 to 470°C temperature range, these two processes overlap and the decomposition of the β-phase results most likely in the formation of the α-phase, via the intermediate ω-phase. The formation of the ω-phase is not reflected in any changes in the microstructure of the alloy but is revealed by an increase in hardness (up to 48 R_C), a decrease in volume and a decrease in the electrical resistivity (down to 1.4 ohm mm^2/m). The decomposition

S/126/60/010/006/016/022
E193/E483

Decomposition of the Beta-Solid Solution in a Titanium-Manganese Alloy

of the β-phase, leading to the formation of the α-phase via the intermediate ω-phase, is accompanied by an increase in hardness, an increase in volume and a decrease in electrical resistivity (down to 1.0 ohm mm^2/m). Finally, decomposition of the β-phase, leading directly to the formation of the α-phase, brings about a decrease in both hardness (down to 35 R_C) and electrical resistivity (down to 1.0 ohm mm^2/m). There are 5 figures and 5 references: 2 Soviet and 3 English.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova
(Ural Polytechnical Institute imeni S.M.Kirov)

SUBMITTED: July 30, 1960

Card 3/3

S/081/61/000/014/014/030
B103/B217

AUTHORS: Bogachev, I. N., Mints, R. I.

TITLE: Erosion of iron-carbide alloys by cavitation

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 14, 1961, 335, abstract 14И200 (Sb. Povysheniye iznosostoykosti i sroka sluzhby mashin. T. I. Kiyev, AN USSR, 1960, 36-45)

TEXT: Some results of studies on the effect of chemical and phase compositions as well as of structure on the resistance of various types of steel and cast iron to erosion by cavitation (REC) are presented. The REC of alloys was studied by comparative tests. The essential characteristic of this method is the repeated collision of the specimens with the water jet. The REC was estimated gravimetrically. [Abstracter's note: Complete translation.]

Card 1/1

[redacted] S/123/61/000/012/003/042
A004/A101

AUTHORS: Bogachev, I. N.; Zhuravlev, L. G.

TITLE: Investigation of the resistance to wear of steels during abrasive wear

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 12, 1961, 15, abstract 12A115 (V sb. "Povysheniye iznosostoykosti i sroka zluzhby mashin v. I". Kiyev, AN UkrSSR, 1960, 92-101)

TEXT: The authors determined the resistance to wear of a group of alloyed steels, depending on the structural composition and hardness during abrasive wear and also during sliding friction of metal on metal with abrasive interlayer. Specimens 3.5 mm in diameter and 35 mm long were tested at a sliding speed of 0.34 m/sec and a pressure of 14.7 kg/cm^2. The tests lasted 5 hours. The wear magnitude was determined from the reduction in weight. As a result of the investigations it was found that for ferritic steels Mn, Cr, Mo and Co do not affect the resistance to wear, while C and Si increase it and Ni somewhat increases the wear. Lamellar structures possess a 10-20% higher resistance to wear.

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S/123/61/000/012/003/042
A004/A101

Investigation of the resitance ...

During the sliding of metal on metal with an abrasive interlayer the wear is determined by absolute hardness values of the friction surfaces and their ratio.

V. Kolesnik

[Abstracter's note: Complete translation]

Card 2/2

S/276/63/000/002/048/052
A052/A126

AUTHORS: Mikhalev, M.S., and Bogachev, I.N.

TITLE: Some problems of low-carbon steel strengthening due to alloying

PERIODICAL: Referativnyy zhurnal, Tekhnologiya mashinostroyeniya, no.2, 1963, 10-11, abstract 2G54 (Tr. Ural'skogo n.-i. in-ta chern. metallov, no. 1, 1961, 145-159)

TEXT: The intensity of the yield-limit increase at alloying low-carbon normalized steel with the studied elements decreases successively in the row Ti, Al, P, V, C, Mo, Mn, Cu, W, Si, Cr, Ni and Co. When Mn, Si, Cu, Ni, Cr, Mo and W are added the yield limit decreases due to the ferrite strengthening in the form of solid solution formation and due to the increase of the amount of the perlitic component in the structure of steel; when P and Co are added the yield limit decreases due to the ferrite strengthening at the solid solution formation only, and with the increase of carbon content, due to the increase of the perlitic component. Alloying steel with Al results in an increase of the yield limit mainly (and in the

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Some problems of low-carbon...

case of titanium, partly) because of the breaking up of the grain. A strong strengthening effect of V in low-carbon steel is caused by the age hardening process taking place at the decomposition of V-supersaturated α -solid solution.

(Abstracter's note: Complete translation.)

S/143/61/000/002/004/006
A207/A126

AUTHORS: Bogachev, I. N., Doctor of Technical Sciences, Professor, Mints, R. I., Candidate of Technical Sciences

TITLE: On the principle of selection of austenitic steel for parts working under conditions of cavitational destruction

PERIODICAL: Energetika, no. 2, 1961, 97 - 102

TEXT: The authors had previously conducted a study of the metallographic picture which led to the derivation of laws facilitating the selection of steel gradings for certain conditions. The austenite steels are tentatively divided into two groups differing from each other by the various resistance to plastic deformation. The nature of these steels is judged by the change in the surface hardness at different periods of cavitational action. A study of this action showed that there were various features in the destruction of the austenite, having different composition and nature. These features seem to be connected with the resistance to plastic deformation. The authors give a detailed comparison. There are 4 figures and 6 Soviet-bloc references.

Card 1/2

S/143/61/000/002/004/006
On the principle of selection of austenitic steel... A207/A126

ASSOCIATION: Ural'skiy politekhnicheskiy institut imeni S. M. Kirova, kafedra metallovedeniya i termoobrabotki (The Urals Polytechnical Institute imeni S. M. Kirov, Department of Metal Science and Thermal Processing)

SUBMITTED: January 29, 1960

Card 2/2

18.7500 1555 1418 1413

S/148/61/000/002/009/011
A161/A133

AUTHORS: Bogachev, I. N., Sachavskiy, A. F.

TITLE: The effect of the α -and ε -phases on the hardening of austenitic steel during deformation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no. 2, 1961, 100 - 108

TEXT: It is known that the plastic deformation of unstable austenitic steel can be accompanied by phase transformations [Ref. 1, 2: B. Cina, Acta Metallurg., 1958, 6, no. 12; J. Gordon-Parr. J. Iron St. Inst., 1952, 171, 137] and that the hardening degree depends on the mechanical working and phase hardening [Ref. 3: L. S. Moroz. Tonkaya struktura i prochnost' stali (The Fine Structure and Strength of Steel), Mashgiz, 1957, 51, 80]. Thus unstable austenitic steel is of more practical interest than stable one. The article presents information on the techniques and results of an investigation of unstable austenite during cold plastic deformation in manganese and nickel steel. Metal was melted in an induction furnace; 30-kg ingots heated slowly to 1,160 - 1,200°C, soaked for 6 hours and forged into rods; annealed for 2 hours at 900°, reheated to 1,060 - 1,100°, soaked

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The effect of the α -and ε -phases on the hardening of..

for 1 h and hardened in water. Specimens cut from the rods were tension-tested at a constant deformation rate. An Amsler tensometer was used for the elongation measurements. The quantity of deformation of martensite was determined magnetically and by X-rays; the irreversible length variations during the heating of deformed specimens were investigated with a Chevenard dilatometer. The hardening intensity varied abruptly at slight deformation and was practically constant at elongation above 1%. The experiment results are illustrated in graphs, a set of X-ray photographs and four photo-micrographs showing that martensite formed during the deformation of nickel steels, and the ε -phase plus martensite in manganese steels. Deformation martensite was distributed differently - very nonuniformly in manganese steel, and forming chains of crystallites in every grain when deformation was slight and the martensite quantity low, and uniformly and without orientation in nickel steels. The presence of ε and its variation was seen in changing intensity of (101) Kα on the X-ray pictures. Conclusions: 1) Stable as well as unstable manganese austenite hardens at room temperature more than nickel austenite; 2) At equal carbon content, the hardening of unstable austenite is always higher than in stable and depends on the intensity of the martensite and ε formation in strain; 3) The higher hardening degree in manganese steel compared to nickel steel at the same intensity of martensite formation may be connected with the ε forma-

S/148/61/000/002/009/011
A161/A133

The effect of the α -and ε -phases on the hardening.

tion; 4) The ε formation causes the appearance of oriented stresses of the second order in manganese steel, and the stresses have the inverse sign in relation to the applied external stresses; 5) Relaxation of oriented stresses of the second order in manganese steel in the 170 - 380°C range is due to coherent inverse $\varepsilon \rightarrow \gamma$ transformation; 6) The hardening in the temperature range above which no more ε and martensite is produced by deformation is practically determined by the carbon content only. There are 7 figures and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The two references to English-language publications are cited in text.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

SUBMITTED: July 8, 1960

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S/129/61/000/011/003/010
E111/E135

AUTHOR: Bogachev, I.N., Doctor of Technical Sciences, Professor

TITLE: Problems in the strengthening of austenitic steels

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, no.11, 1961, 20-24

TEXT: The author examines the strengthening of austenitic steels in static and dynamic loading on the basis of work carried out at the problemnaya laboratoriya (Problems Laboratory) of the kafedra termoobrabotki (Department of Heat Treatment) of the Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute) in which he participated. Stable and unstable austenite should strengthen differently. However, in the case of static extension of austenite containing 0.04% C the nature of strengthening was the same for different concentrations of other elements (Ref.1: I.N. Bogachev, A.F. Sachavskiy, sb. Uprocheniye staley, Metallurgizdat, 1961). On the other hand resistance to small plastic deformations was higher for type Г 31 (G31) manganese steel than for type Н 36 (N36) steel. Brinell test results

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showed a similar distinction. Introduction of carbon into these steels increases the resistance to small plastic deformations and the strengthening coefficient, the effect depending on composition. Additional alloying with chromium (Ref.2: I.N. Bogachev, A.F. Sachavskiy, Symp. "Science of Metals and Foundry Industry", NIITYaZhMASh UZTM, 1960) increases the strengthening coefficient of manganese steels. Plastic deformation of unstable steels, in addition to strengthening the solid solution, is accompanied by formation of α- and ε-phases (Ref.3: I.N. Bogachev, A.F. Sachavskiy, Chernaya metallurgiya, no.2, 1961). This is particularly pronounced in manganese steels. In austenitic manganese steels ε-martensite is formed when the steel contains over 12% Mn, the plates more usually being formed in two or three intersecting planes and sometimes extending beyond a grain. Such effects may be due to transition from one orientation to another (Ref.4: I.N. Bogachev et al., Symposium "Strengthening of Steels", Metallurgizdat, 1960). Preliminary deformation can either increase or decrease the extent of the transformation, depending on the temperature and degree of

deformation (Ref.5: L.S. Yershova, I.N. Bogachev, R.S. Shklyar, Fizika metallov i metallovedeniye, no.7, 1961). The effect of alloying elements on the $\gamma \rightarrow \varepsilon$ transformation has not been studied sufficiently. Quenching of iron-manganese alloys of the Г18 (G18) type gives approximately equal quantities of austenite and ε-phase: 20% plastic deformation raises the latter to 60% (10% α-martensite). Strengthening depends on the phase ratio, which is influenced by manganese and carbon content. Work hardening of the solid solution is also involved. Comparison of manganese and nickel steels with different phase compositions in the hardened state shows differences in austenite stability. In plastic deformation of stable austenite 20Н18Г6 (20N18G6) steel, strengthening is atrributable only to fine-structure changes. Manganese austenite strengthens more than nickel austenite. As was to be expected, the peculiarities of the hardening of the various austenitic steels are more pronounced with impact than with static loading (Ref.6: R.I. Mints, I.N. Bogachev, Symposium "Strengthening of Steels", Metallurgizdat, 1960, and Ref.7: I.N. Bogachev, R.I. Mints, Izv. vysshikh uchebnykh zavedeniy, Energetika, no.2, 1961). With repeated impact loading

strengthening of manganese steels is slower than that of nickel steels. Deformation of manganese austenite develops within the grain, that of nickel appears at grain boundaries. Increase in carbon content in the former delays deformation and fracture becomes more uniform due to the effect of martensite; in the latter the general nature of deformation remains unchanged, although some strengthening of austenite occurs. The author goes on to point out that ordinary mechanical properties cannot satisfactorily characterize service behaviour of a metal in contact loading with a concentrated impact. With respect to resistance to hydraulic impact (cavitation failure) the best results are given by structurally unstable, homogeneous solid solutions (austenite) which under micro-impact conditions strengthen in several stages; mechanical strengthening of the solid solution itself, strengthening through phase changes (formation of α- and ε-martensite) and strengthening of the newly formed phases. Steels for turbines etc. should be chosen on this principle. There are 8 figures and 7 Soviet-bloc references.

ASSOCIATION: Ural'skiy politekhnicheskiy institut
(Ural Polytechnical Institute)

BOGACHEV, I.N.; DAVYDOV, G.S.; Prinimal uchastiye SHEN' DE-FAN [Shen Te-fang]

Effect of preliminary isothermal hardening on the graphitization of white cast iron. Izv. vys. ucheb. zav.; chern. met. 4 no.7:154-161 '61. (MIRA 14:8)

1. Ural'skiy politekhnicheskiy institut.
(Cast iron—Hardening)

S/126/61/011/001/009/019
E111/E452

18.8200

AUTHORS: Bogachev, I.N., Shklyar, R.Sh., Slyusareva, L.D., Mints, R.I. and Syutkin, N.N.

TITLE: Change in Structure and Phase Composition of Some Austenitic Steels in the Initial Stages of Cavitation Failure

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1, pp.86-93

TEXT: Bogachev and Mints have previously shown that the resistance to cavitation of austenitic nickel manganese, chromium-nickel and chromium-manganese steels varies greatly (Ref.1). The object of the present work was to study structural changes during cavitation failure in the surface layers of the austenitic steels of the following types and compositions (%):

		C	Ni	Mn	Cr
1Kh18N8	1Х18Н8	0.12	8.39	0.92	18.05
30G10Kh9	30Г10Х9	0.31	0.13	10.30	9.117
40N25	40Н25	0.40	25.00	0.20	0.13
80G14	80Г14	0.81	1.10	14.50	0.40

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